

What is claimed is:

1. A software object approval method for use in a safety instrumented system, the method comprising:

obtaining electronic identification information representing a group of entities whose approval is needed prior to implementing a software object within a safety instrumented system in response to a change being made to the software object in a software object design environment;

electronically transmitting a request for review of the software object to each of the entities within the group of entities;

receiving from each entity within the group of entities an electronic indication regarding an approval or a disapproval of the software object; and

preventing the implementation of the software object in the safety instrumented system until each entity within the group of entities provides an electronic indication approving the software object.

2. The method of claim 1, wherein electronically transmitting the request for review of the software object includes electronically notifying each entity within the group of entities via a communication network.

3. The method of claim 2, wherein electronically transmitting the request includes sending an electronic mail message to each entity within the group of entities.

4. The method of claim 1, wherein preventing the implementation of the software object in the safety instrumented system until each entity within the group of entities provides an electronic indication approving the software object includes allowing the software object to be downloaded to the safety instrumented system if each entity within the group of entities approves the software object.

5. The method of claim 1, wherein obtaining electronic identification information representing a group of entities includes determining a risk reduction factor and selecting the group of entities based on the risk reduction factor.

6. The method of claim 5, wherein obtaining electronic identification information representing a group of entities includes determining a safety instrumentation level from the risk reduction factor and selecting the group of entities based on the determined safety instrumentation level.

7. The method of claim 6, wherein obtaining electronic identification information representing a group of entities includes determining the number of persons in the group of entities from the safety instrumentation level.

8. The method of claim 6, wherein obtaining electronic identification information representing a group of entities includes determining the job positions of the persons in the group of entities from the safety instrumentation level.

9. The method of claim 1, further including logging the electronic indication regarding the approval or the disapproval of the software object received from one or more of the entities within the group of entities.

10. The method of claim 1, wherein obtaining electronic identification information representing a group of entities whose approval is needed includes prompting a designer for the electronic identification information.

11. The method of claim 1, wherein obtaining electronic identification information representing a group of entities whose approval is needed includes determining the number of persons in the group of entities.

12. The method of claim 1, wherein preventing the implementation of the software object includes preventing the software object from being downloaded to a control environment.

13. The method of claim 1, wherein preventing the implementation of the software object in the safety instrumented system includes storing an override key and enabling a user to use the override key to download the software object in the safety instrumented system before each entity within the group of entities provides an electronic indication approving the software object.

14. The method of claim 1, further including detecting when the change is made to the software object in the software object design environment.

15. The method of claim 14, wherein detecting when the change is made to the software object in the software object design environment includes changing a version number associated with the software object when the change is made to the software object.

16. The method of claim 14, wherein detecting when the change is made to the software object in the software object design environment includes detecting when a new software object is created in the software object design environment.

17. The method of claim 14, wherein detecting when the change is made to the software object in the software object design environment includes detecting when a user initiates an approval procedure in the software design environment.

18. The method of claim 1, further including monitoring a software object for testing purposes to determine when a test for the software object is overdue.

19. The method of claim 18, wherein determining when a test for the software object is overdue includes calculating a new risk reduction factor for the software object after the test for the software object is overdue, and comparing the new risk reduction factor to the original risk reduction factor for the software object.

20. The method of claim 18, further including generating an alarm signal to be sent to a user when the test for the software object is overdue.

21. The method of claim 18, further including generating a work order to be sent to a user when the test for the software object is overdue.

22. A software object approval system for use in a process control system including a processor, the software object approval system comprising:

a computer readable medium; and

software stored on the computer readable medium and adapted to be executed by the processor to:

obtain electronic identification information representing a group of entities whose approval is needed prior to implementing a software object on-line within the process control system after a change is made to the software object in a software object design environment;

electronically transmit a request for review of the software object to each of the entities within the group of entities;

receive from each entity within the group of entities an electronic indication regarding an approval or a disapproval of the software object; and

prevent the implementation of the software object in the process control system until each entity within the group of entities provides an electronic indication approving the software object.

23. The software object approval system of claim 22, wherein the software electronically transmits a request by sending an electronic mail message to each entity within the group of entities.

24. The software object approval system of claim 22, wherein the software obtains electronic identification information representing the group of entities by determining a risk reduction factor and selecting the group of entities based on the risk reduction factor.

25. The software object approval system of claim 24, wherein the software obtains electronic identification information representing the group of entities by determining a safety instrumentation level from the risk reduction factor and selecting the group of entities based on the determined safety instrumentation level.

26. The software object approval system of claim 25, wherein the software obtains electronic identification information representing the group of entities by determining the number of persons in the group of entities based on the safety instrumentation level.

27. The software object approval system of claim 25, wherein the software obtains electronic identification information representing the group of entities by determining the job positions of the persons in the group of entities based on the safety instrumentation level.

28. The software object approval system of claim 22, wherein the software logs the electronic indication regarding the approval or the disapproval of the software object received from one or more of the entities within the group of entities.

29. The software object approval system of claim 22, wherein the software obtains electronic identification information representing the group of entities whose approval is needed by prompting a designer for the electronic identification information.

30. The software object approval system of claim 22, wherein the software detects when the change is made to the software object in the software object design environment.

31. The software object approval system of claim 30, wherein the software detects when the change is made to the software object in the software object design environment by detecting when a new software object is created in the software object design environment.

32. The software object approval system of claim 30, wherein the software detects when the change is when a user initiates an approval procedure in the software design environment.

33. The software object approval system of claim 30, wherein the software changes a version number associated with the software object when the software detects that the change is made to the software object in the software object design environment.

34. The software object approval system of claim 22, wherein the software stores an override key and enables a user to use the override key to download the software object in the process control system before each entity within the group of entities provides an electronic indication approving the software object.

35. The software object approval system of claim 22, wherein the software further monitors the software object when the software object is downloaded to the process control system for testing purposes to determine when a test for the software object is overdue.

36. The software object approval system of claim 35, wherein the software determines when a test for the software object is overdue by calculating a new risk reduction factor for the software object after the test for the software object is overdue, and compares the new risk reduction factor to the original risk reduction factor for the software object.

37. The software object approval system of claim 36, wherein the software further generates an alarm signal to be sent to a user when a test for the software object is determined to be overdue.

38. The software object approval system of claim 36, wherein the software further generates a work order to be sent to a user when a test for the software object is determined to be overdue, the work order specifying a test to be performed for the software object.

39. The software object approval system of claim 22, wherein the software object is a safety system software object to be used to implement safety procedures in the process control system.

40. An approval system for use in a process control or safety instrumented system in a process plant having one or more processors, the approval system comprising:

a computer readable medium;

a first routine stored on the computer readable medium and adapted to be executed on the one or more of the processors to electronically transmit a request for review of the software object to each entity within a group of entities in response to a change being made to the software object; and

a second routine stored on the computer readable medium and adapted to be executed on the one or more of the processors to prevent implementation of the software object in the process control or safety instrumented system until each entity within the group of entities provides an electronic indication approving the software object.

41. The approval system of claim 40, further including a third routine that is adapted to be executed on the one or more of the processors to obtain electronic identification information representing the group of entities whose approval is needed prior to implementing the software object within the process control or safety instrumented system.

42. The approval system of claim 41, wherein the third routine is adapted to obtain the electronic identification information representing the group of entities by determining a risk reduction factor and selecting the group of entities based on the risk reduction factor.

43. The approval system of claim 42, wherein the third routine is adapted to obtain the electronic identification information representing the group of entities by determining a safety instrumentation level from the risk reduction factor and selecting the group of entities based on the determined safety instrumentation level.

44. The approval system of claim 43, wherein the third routine is adapted to obtain the electronic identification information representing the group of entities by determining a number of persons in the group of entities based on the safety instrumentation level.

45. The approval system of claim 43, wherein the third routine is adapted to obtain the electronic identification information representing the group of entities by determining job positions of persons in the group of entities based on the safety instrumentation level.

46. The approval system of claim 40, wherein the first routine is adapted to electronically transmit a request by sending an electronic mail message to each entity within the group of entities.

47. The approval system of claim 40, wherein the second routine is adapted to log the electronic indication regarding an approval or a disapproval of the software object received from one or more of the entities within the group of entities.

48. The approval system of claim 40, including a third routine adapted to be executed on the one or more of the processors to obtain the electronic identification information representing the group of entities whose approval is needed by prompting a person for the electronic identification information.

49. The approval system of claim 40, wherein the second routine is adapted to store an override key and to enable a user to use the override key to download the software object in the process control safety instrumented system before each entity within the group of entities provides an electronic indication approving the software object.

50. The approval system of claim 40, including a third routine stored on the computer readable medium and adapted to be executed on the one or more of the processors to detect when the change is made to the software object.



51. The approval system of claim 50, wherein the third routine is adapted to change a version number associated with the software object in response to the first routine detecting a change being made to the software object.

52. The approval system of claim 50, wherein the third routine is adapted to detect when a change is made to the software object by detecting when a new software object is created in a software object design environment.

53. The approval system of claim 50, wherein the third routine is adapted to detect when a change is made to the software object by detecting when a user initiates an approval procedure in a software design environment.

54. The approval system of claim 40, further including a third routine adapted to be executed on the one or more of the processors to monitor a software object that is operating on-line in the process control or safety instrumented system for testing purposes to determine when a test for the software object is overdue.

55. The approval system of claim 54, wherein the third routine is adapted to determine when a test for the software object is overdue by calculating a new risk reduction factor for the software object after the test for the software object is overdue and by comparing the new risk reduction factor to an original risk reduction factor for the software object.

56. The approval system of claim 55, wherein the third routine is adapted to generate an alarm signal to be sent to a user when the new risk reduction factor differs from the original risk reduction factor by a particular amount.

57. The approval system of claim 55, wherein the third routine is adapted to generate a work order to be sent to a user when the new risk reduction factor differs from the original risk reduction factor by a particular amount, the work order specifying a test to be performed for the software object.